Ecological studies of the Kenai Peninsula brown bear

Sean Farley

Please note: This is a progress report on continuing research. Information may be refined at a later date.

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FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

PROJECT TITLE: Ecological studies of the Kenai Peninsula brown bear

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COOPERATORS: Kenai National Wildlife Refuge, United States Fish and Wildllife Service, U.S. Dept. of Interior; Chugach National Forest, U. S. Forest Service, U.S. Department of Agriculture; Kenai Fjords National Park, National Park Service, U.S. Department of Interior

GRANT AND SEGMENT NR.: W-27-3
PROJECT NR.:   4.29
SEGMENT PERIOD: 1 July 1999 – 30 June 2000

STATE: Alaska
WORK LOCATION: Kenai Peninsula

I. PROGRESS ON PROJECT OBJECTIVES

1. Assess survivorship and recruitment to evaluate perceived population trends seen in recapture data. *The starting point for this objective begins with a calculated survivorship of 0.9032 (CI=0.799-1.007; n = 31), 0.6 (CI=0.352-0.846; n=15), and 0.667 (CI=0.428-0.905; n=15) for adult females, Cubs of the Year (COY), and Yearlings, respectively. Additional data will be collected each year during telemetry tracking sessions.*

2. Determine if Kenai brown bears represent a population exhibiting large litter sizes and early weaning. *Previous work has shown the Kenai Peninsula brown bear population has COY litters which average 2.36 $\pm$ 0.67 cubs (n = 56), Yearling litters which on average contain 2.06 $\pm$ 0.65 (n = 51) animals, and even litters of two-year olds (2.04 $\pm$ 0.68 individuals; n = 25). The mean interval between litters is 3.5 $\pm$ 0.6 years (n = 13).*

3. Measure the degree of heterozygosity seen in the Kenai brown bears and calculate an "effective population size" (N_e). *No work has been done on this objective yet.*

4. Assess habitat use, identify key travel corridors, and quantify the nutritional resource needs of adult male brown bears. *Several adult male bears have been handled and collared in recent years, but technical difficulties with the collars have limited the amount of useful data gathered.*

5. Experimentally evaluate if the management concept of "buffers" has biological relevance to Kenai brown bears. *No work has been accomplished on this objective.*

6. Continue to evaluate and refine the cumulative effects model. *The vegetation map of the Kenai Peninsula has become available and will be used in the test of the cumulative effects model.*

7. Develop and apply new technologies (e.g., video collars, triaxial accelerometers) to ecological studies of bears. *Plans have been drafted for different collar types.*

8. Determine if the geographic range of Kenai Peninsula brown bears extends into Prince William Sound. *Hair traps were placed at likely salmon streams in Prince William Sound.*

9. Continue publication and report writing.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOBS (related objectives indicated in parentheses)

1. Assess population trend from additional data on population age structure, adult and offspring survival, and offspring recruitment. Information will be collected in the course of radio-collaring across the peninsula (1, 2). *Additional data on cub production, survivability, and litter sizes was collected during 7 telemetry flights in 1999-2000.*

2. Use biological samples (blood and tissue) collected from radio-collared and sealed bears for mitochondrial and microsatellite analyses (3). *Archived samples from brown bear capture work extending from the early 1990s to 1999 were sent out for laboratory analyses. To date, we have not yet reviewed these analyses.*

3. Specifically capture adult male brown bears for radio-collaring and biological sample collection. Employ new technology (remote release Global Positioning System (GPS), video, and tri-axial accelerometer collars, stable isotope and fatty acid signatures, and total body water dilution to better assess the nutritional ecology (e.g., seasonal diet and changes in body composition) of adult male brown bears (1, 3, 4, 7). *The collaring of large adult male brown bears was beset by technical difficulties. Four (4) males were darted from helicopters and fitted with collars. Two collars were broken by the males and two were shed. The collars broke at a weak attachment point, which we fixed by having a local machine shop construct a new piece of metal. The collar company (ATS) now adopts our fix as standard in their collar design.*

4. Conduct snaring in areas critical to management, but impossible to work by air (5). *No snaring occurred in 1999–2000. There are few people with the expertise to safely use this technique and we were unable to secure the services of one of these individuals.*

5. Develop algorithms to simulate the assumed biological basis of "buffers", utilizing extensive location data collected by GPS collars. Attempt to conduct controlled field experiment to test assumptions, using radio-collar animals in areas with known timber (5). *No work was accomplished on this job this year. Collaring efforts were futile this year as we experienced a failure rate of 75% on collars. The manufacturer has identified the cause to be a bad solder joint.*

6. Continue to map brown bear locations collected via aerial telemetry and GPS collars for identification of habitat use, peninsula-wide species range, and discrete travel corridors (6). *In conjunction with Federal aid project 4.27, 30 animals were captured a total of 37 times. Twelve (12) GPS-SOB collars were placed on adult females, 4 GPS-SOB collars were placed on adult males, and five (5) received VHF radio collars. Six (6) GPS collars were recovered from the females and 3 from the males. As mentioned above, we experienced a catastrophic failure in GPS-SOB collar function. Though we collected few locations from GPS-SOB collars, fixed-wing telemetry flights continued. No work has been accomplished on data analysis for travel corridors.*

7. Incorporate the soon-to-be-released Peninsula vegetation map for testing and refinement of the cumulative effects model (6). *The vegetation map has been incorporated into a resource selection-function map that will identify probabilities of landscape use by brown bears.*

8. Collect scat samples from select salmon streams on the Peninsula's east coast; use DNA-based techniques to determine if the samples are black or brown bear in origin (8). *Three trips were made to construct and service hair snare traps (baited with scent) in Prince William Sound. During the third trip the boat motor blew a cylinder and collection work ceased for the year. Hair was collected at several sites and has been submitted to the laboratory for sex and species determination. The hairs appeared to be from black bears exclusively.*

9. Preparation of reports and technical publications (9). *Summary reports were compiled.*

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD: *There was none.*

IV. FEDERAL AID TOTAL PROJECT COSTS FOR THIS SEGMENT PERIOD

$102, 100.00

V. **PREPARED BY:**   **APPROVED BY:**

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